In The Claims

1. A luminophore comprising a donor portion (D) in close association with an acceptor portion (A) sufficient for resonant energy transfer from D to A, wherein upon excitation by external electromagnetic radiation of a wavelength shorter than λ_1, said luminophore emits luminophore radiation of a wavelength longer than λ_1, which is in the range of about 400 to about 1200 nm with an emission lifetime τ_1 and a quantum yield Q_1,

wherein when D is not in said close association with A, it absorbs radiation of a wavelength λ_2 shorter than λ_1 and thereafter emits radiation with a quantum yield Q_2 less than about 0.2,

wherein when said donor portion D is in said close association with A and is excited by electromagnetic radiation of wavelength shorter than λ_1, it resonantly transfers energy to said acceptor portion A which then resonantly emits said luminophore radiation, and wherein said quantum yield Q_1 is substantially greater than Q_2.

2. A luminophore of claim 1, which is a chemical compound wherein D is covalently linked to A.

3. A luminophore of claim 1, wherein each of D and A are bound to separate molecules which can interact in solution to form said close association.

4. A luminophore of claim 1, wherein said luminophore radiation has a wavelength of 550 to 1000 nm.

5. A luminophore of claim 4, wherein the emission lifetime τ_1 is 25 ns to 100 μs.

6. A luminophore of claim 5, wherein said luminophore emission has a quantum yield Q_1 of about 1.

7. A luminophore of claim 6, wherein at least one of D and A comprises a functional group by which it can be covalently bonded to another compound.

8. A compound of the formula

D-L-A

wherein D is a donor metal ligand complex having a quantum yield less than about 0.2 for emissions in the wavelength range greater than about 400 nm;
A is an acceptor of energy resonantly transferred from D which is then emitted in the wavelength range of about 400 to about 1200 nm; and
L is a spacer of a length effective for resonant energy transfer between D and A.

9. A compound of claim 2, further comprising a functional group by which it can be covalently bonded to another compound.

10. In a chemical compound marked with a covalently bonded detectable label, the improvement wherein the label is a compound of claim 9.

11. A method of labeling a chemical compound comprising covalently bonding thereto a compound of claim 9.

12. In a method of identifying a chemical species in a mixture of compounds comprising detecting radiation emitted by said chemical species, the improvement wherein said chemical species is a compound of claim 10.

13. A method of providing a probe which emits luminophore radiation of a wavelength λ_1 in the range of about 400 nm to about 1200 nm with a high quantum yield Q_1 and a half-life greater than about 25 ns, comprising placing a donor molecule D, which per se emits radiation of a wavelength less than λ_1 with a quantum yield substantially lower than Q_1, in close association with an acceptor molecule A sufficient for resonant energy transfer from D to A, as a result of which D resonantly transfers energy to A and A emits said luminophore radiation.

14. A compound of claim 8, wherein D is a transition metal ligand complex.

15. A compound of claim 14, wherein said transition metal is Re, Ru, Os or Ir.

16. A luminophore of claim 1, wherein D is a transition metal ligand complex.

17. A luninophore of claim 1, wherein said quantum yield Q_2 is about 0.1.